

4.21 Permanent Seeding

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Definition

The establishment of perennial vegetative cover on disturbed areas by planting seed.

Purposes

Permanent seeding is used to reduce erosion and decrease sediment yield from disturbed areas and to permanently stabilize disturbed areas in a manner that is economical, adaptable to site conditions, and allows selection of the most appropriate plant materials.



Conditions

Permanent shall be performed in disturbed areas where permanent, long-lived vegetative cover is needed to stabilize the soil and in rough-graded areas that will not be brought to final grade for 1 year or more.

Planning Considerations

Vegetation controls erosion by reducing the velocity and the volume of overland flow and protecting the bare soil surface from raindrop impact. Areas that must be stabilized after the land has been disturbed require vegetative cover. The most common and economical means of establishing this cover is by seeding grasses and legumes.

Advantages of seeding over other means of establishing plants include the small initial establishment cost, the wide variety of grasses and legumes available, low labor requirement, and ease of establishment in difficult areas.

Disadvantages include the potential for erosion during the establishment stage, a need to reseed areas that fail to establish, limited periods during the year suitable for seeding, and a need for water and appropriate climatic conditions during germination.

There are so many variables in plant growth that an end product cannot be guaranteed. Much can be done during the planning stages to increase the chances for successful seeding. Selection of the right plant materials for the site, good seedbed preparation, and conscientious maintenance are important.

Soils can be modified with lime and fertilizer, but climate cannot be controlled. Microclimate, or localized climate conditions, can affect plant growth. A south-facing slope is dried and hotter than a north-facing slope and may require drought-tolerant plants. Shaded areas require shade-tolerant plants; the windward side of a ridge will be drier than the leeward, etc.

A prime consideration in selecting which plants to establish is the intended use of the land. All of these uses—residential, industrial, commercial, and recreational—can be separated into two categories: high maintenance and low maintenance.

High-maintenance areas will be mowed frequently, lime and fertilized regularly, and will wither receive intense use (e.g., athletics) or require maintaining to an aesthetic standard (home lawns). Grasses used for these situations must be fine-leafed and attractive in appearance, able to form tight sod, and be long-lived perennials. They must be well adapted to the geographic area where they are planted, because constant mowing puts turf under great stress. Sites where high-maintenance vegetative cover is desirable include homes, industrial parks, schools, churches, and some recreational areas.

Low-maintenance areas will be mowed infrequently or not at all; lime and fertilizer may not be applied on a regular basis; the areas will not be subjected to intense use, nor required to have a uniform appearance. These plants must be able to persist with little maintenance over long periods of time. Grass and legume mixtures are favored for these sites because legumes are capable of fixing nitrogen from the air for their own use, and the use of the plants around them. Such mixed strains are better able to withstand adverse conditions. Sites that would be suitable for low-maintenance vegetation include steep slopes, stream or channel banks, some commercial properties, and “utility turf” areas such as roadbanks.

Seedbed Preparation

The soil on disturbed site must be modified to provide an optimum environment for seed germination and seedling growth. The surface soil must be loose enough for water infiltration and root penetration. The pH (acidity and alkalinity) of the soil must be such that it is not toxic and nutrients are available, usually between pH 6.0-7.0. Sufficient nutrients—added as fertilizer—must be present. After seed is in place, it must be protected with mulch to hold moisture and modify temperature extremes, and to prevent erosion while seedlings are growing.

The addition of lime is equally as important as applying fertilizer. Lime is best known as a pH, or acidity modifier, but it also supplies calcium and magnesium which are plant nutrients. Its effect on pH makes other nutrients more available to the plant.

Maintenance

Even with careful, well-planned seeding operations, failures can occur. When it is clear that plants have not germinated on an area or have died, these areas must be reseeded immediately to prevent erosion damage. Healthy vegetation is the most effective erosion preventive available.

Seedbed Requirements

Vegetation should not be established on slopes that are unsuitable due to inappropriate soil texture, poor internal structure or internal drainage, volume of overland flow, or excessive steepness, until measures have been taken to correct these problems.

To maintain a good stand of vegetation, the soil must meet certain minimum requirements as a growth medium. The existing soil must have these criteria:

1. Enough fine-grained material to maintain adequate moisture and nutrient supply.
2. Sufficient pore space to permit root penetration. A bulk density of 1.2 to 1.5 indicates that sufficient pore space is present. A fine granular or crumb-like structure is also favorable.
3. Sufficient depth of soil to provide an adequate root zone. The depth to rock or impermeable layers such as hardpans shall be 12 inches or more, except on slopes steeper than 2:1 where the addition of soil is not feasible.
4. A favorable pH range for plant growth. If the soil is so acid that a pH range of 6.0–7.0 cannot be attained by addition of pH-modifying materials, then the soil is considered an unsuitable environment for plant roots.
5. Freedom from toxic amounts of materials harmful to plant growth.
6. Freedom from excessive quantities of roots, branches, large stones, large clods of earth, or trash of any kind. Clods and stones may be left on slopes steeper than 3:1 if they are to be hydroseeded.

Necessary mechanical erosion and sediment control practices will be installed prior to seeding. Grading will be carried out according to the approved plan.

Surfaces will be roughened in accordance with “Surface Roughening.”

Soil Conditioners

In order to modify the texture, structure, or drainage characteristics of a soil, the following materials may be added to the soil:

1. **Peat** shall be sphagnum moss peat, hypnum moss peat, reed-sedge peat or peat humus, from fresh-water sources. Peat shall be shredded and conditioned in storage piles for at least six months after excavation.
2. **Sand** shall be clean and free of toxic materials.
3. **Vermiculture** shall be horticultural grade and free of toxic substances.
4. **Rotted manure** shall be stable or cattle manure not containing undue amounts of straw or other bedding materials or toxic chemicals.
5. **Thoroughly rotted sawdust** shall have 6 pounds of nitrogen added to each cubic yard and shall be free of stones, sticks, and toxic substances.

Lime and fertilizer shall be incorporated into the top 4 to 6 inches of the soil by discing or other means. When applying lime and fertilizer with a hydroseeder, apply to a rough, loose surface.

Seeding

1. Certified seed will be used for all permanent seeding whenever possible.
2. Legume seed should be inoculated with the inoculant appropriate to the species. Seed of lespedezas, crown vetch, and clovers should be scarified to promote uniform germination.
3. Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydroseeder on a firm, friable seedbed. Maximum seeding depth should be ¼ inch.
4. To avoid seed damage during hydroseeding, it is recommended that if the machinery breaks down for ½ to 2 hours, 50 percent more seed be added to the

tank, based on the proportion of the slurry remaining in the tank. Beyond 2 hours, a full rate of new seed may be necessary.

Often hydroseeding contractors prefer not to apply lime in their rigs as it is abrasive. In inaccessible areas, lime may have to be applied in pellet or liquid form, separately. Rates of wood fiber should be at least 2,000 lbs. per acre. Surface roughening is particularly important when hydroseeding, as a roughened slope will provide some natural coverage of lime, fertilizer and seed.

5. Legume inoculants should be applied at four times the recommended rate when inoculant is included in the hydroseeder slurry.

Mulching

All permanent seed must be mulched immediately upon completion of seed application.

Maintenance of New Seed

Irrigation

New seed should be supplied with adequate moisture. Supply water as needed, especially late in the season, in abnormally hot or dry weather, or on adverse sites. Water application rates should be controlled to prevent runoff. Inadequate amounts of water may be more harmful than no water.

Reseeding

Inspect seeded areas for failure and make necessary repairs and reseed within the same season, if possible.

If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

If a stand has less than 40 percent cover, reevaluate choice of plant materials and quantities of lime and fertilizer. Reestablish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. If vegetation has failed to grow, soil must be tested to determine if acidity or nutrient imbalances are responsible.

Fertilization

Seedlings should be fertilized 1 year after planting to ensure proper stand density.

Generally, a stand of vegetation cannot be determined fully established until soil cover has been maintained for 1 full year from planting. Disturbed areas to be stabilized with permanent vegetation must be seeded or planted within 15 days after final grade is reached unless temporary stabilization is applied.